

**INVESTIGATING A FRAMEWORK FOR PROVIDING MOBILE
BANKING OPPORTUNITIES TO RURAL SMES IN
BANGLADESH**

A Dissertation Presented

by

Md Taimur Ahad

Supervisors

Dr Laurel Evelyn Dyson

Dr Valerie Gay

Submitted to
Faculty of Engineering and Information Technology (FEIT)
Of the
University of Technology Sydney (UTS)
of the requirements for the degree of

Master of Science in Computing Sciences (Research)

August, 2014

Table of Contents

Table of Contents	iii
Table of Figures.....	x
Table of Tables	xi
Certificate of Original Authorship	xii
Acknowledgements	xiii
Abstract	xv
Publication for this research.....	xvii
Chapter 1	1
Introduction to the research.....	1
1.1 Background of the study	1
1.2 M-banking studies on SMEs.....	3
1.3 M-banking studies in Bangladesh.....	5
1.4 Current research gap in m-banking.....	5
1.5 Aims of this research	7
1.6 Research questions.....	8
1.7 Significance of the research	8
1.7.1 Theoretical significances	9
1.7.2 National level significances	9
1.7.3 Organizational level significances	10
1.7.4 Individual level significances	10
1.8 Contributions	11
1.9 Methodology.....	11
1.10 Brief summary of the findings	12
1.11 Outline of the thesis	13
Chapter 2	15
The research context: Bangladesh.....	15
2.1 Introduction.....	15
2.2 Bangladesh: demographic information	16
2.2.1 Language	17
2.2.2 Literacy Rate.....	18
2.2.3 Bangladesh Economy.....	18
2.3 SMEs in Bangladesh.....	19
2.3.1 What are SMEs?	19

2.3.2	<i>Definitions of SMEs in Bangladesh</i>	19
2.3.3	<i>Characteristics of SMEs</i>	20
2.3.4	<i>SMEs' contributions to the Bangladeshi economy</i>	21
2.3.5	<i>Factors affecting the growth of SMEs in Bangladesh</i>	22
2.4	Bangladesh banking sector	23
2.4.1	<i>Banking arrangements and finance of the SMEs in Bangladesh</i> ...	24
2.5	ICT ecology in Bangladesh	24
2.5.1	<i>Landline telephone subscribers in Bangladesh</i>	25
2.5.2	<i>Internet subscribers in Bangladesh</i>	26
2.6	Mobile phone industry in Bangladesh	26
2.6.1	<i>Mobile phone industry regulators in Bangladesh</i>	27
2.6.2	<i>Mobile phone subscribers in Bangladesh</i>	29
2.7	IT adoption and usage in Bangladeshi banks	29
2.7.1	<i>IT adoption phases in Bangladeshi banks</i>	29
2.7.2	<i>The Central Bank's activities and initiatives</i>	31
2.8	E-banking in Bangladesh	31
2.8.1	<i>E-banking adoption challenges in Bangladesh</i>	32
2.8.2	<i>Recommendations to overcome e-banking challenges in Bangladesh</i>	32
2.9	Conclusion	32
Chapter 3		33
M-banking: An opportunity for SMEs		33
3.1	Introduction.....	33
3.2	Defining M-banking	34
3.2.1	<i>Models of m-banking</i>	35
3.2.2	<i>Technology in m-banking</i>	35
3.3	M-banking in Bangladesh.....	35
3.4	Past, present and future: Research on m-banking.....	36
3.5	M-banking advantages	38
3.5.1	<i>M-banking usage and advantages for the SME</i>	40
3.6	Micro and Macro factors in m-banking	41
3.6.1	<i>Micro-level factors</i>	42
3.6.2	<i>Hypothesis development</i>	47
3.7	Macro-level m-banking success factors.....	51
3.7.1	<i>Ready mobile phone infrastructure</i>	51
3.7.2	<i>Supportive organisational culture to promote m-banking</i>	51

3.7.3	<i>Partnership and communication among stakeholders</i>	52
3.7.4	<i>Government's support of m-banking</i>	52
3.7.5	<i>Supportive national culture to promote m-banking</i>	52
3.7.6	<i>M-banking: Legal and regulatory implications</i>	53
3.7.6.1	Customer perspective regulations	53
3.7.6.2	Providers' perspective regulations	53
3.7.6.3	National level policy and regulations	54
3.8	Barriers to m-banking adoption	56
3.9	Knowledge sharing and recommendations of the stakeholders	58
Chapter 4	59
Research design and research methodology	59
4.1	Introduction.....	59
4.2	Restatement of the research questions	59
4.3	Research design	60
4.4	The Philosophical idea of the research	61
4.5	Research Methodology	62
4.5.1	<i>Mixed method research</i>	64
4.5.2	<i>Strategies of inquiry</i>	66
4.5.3	<i>Survey procedures</i>	66
4.5.3.1	Selection of villages and survey participants.....	66
4.5.3.2	The population, sample and participants	67
4.5.3.3	Justification of quantitative research and participant number ..	68
4.5.3.4	Developing and Pre-testing the questionnaire	68
4.5.3.5	The pilot study	70
4.5.3.6	Survey instrument.....	71
4.5.3.7	Items and variables	71
4.5.3.8	Measurement.....	73
4.5.3.9	The survey process	73
4.6	Qualitative Research	73
4.6.1	<i>Interview</i>	74
4.6.1.1	Selecting banks, telcos and expert representatives	75
4.6.1.2	Gaining access to the organizations.....	77
4.6.1.3	Interview instrument.....	78
4.6.1.4	Interview process	79
4.6.2	<i>Focus group</i>	80

4.6.2.1	Selecting the bank and gaining access to the bank	80
4.6.2.2	Selecting the members of the focus group.....	80
4.6.2.3	Focus group discussion instrument and pre-test of questions...	81
4.6.2.4	Focus group discussion process.....	82
4.7	Ethical considerations	83
4.8	Data interpretation and analysis.....	85
Chapter 5	86
Data analysis and results	86
5.1	Introduction.....	86
5.2	Quantitative data (Survey of SME owners/managers) analysis and results	86
5.2.1	<i>Demographic Data</i>	86
5.2.2	<i>Participants' banking and current problems in banking</i>	89
5.2.2.1	Banking status.....	90
5.2.2.2	Banking frequency.....	90
5.2.2.3	Satisfaction with current banking system	91
5.2.2.4	Support provided to the start-up of SMEs by Banks	92
5.2.2.5	Banking services used by the SMEs.....	93
5.2.2.6	Alternative ways of banking.....	93
5.2.3	<i>Participants' mobile phone adoption and usages of mobile phones</i>	94
5.2.3.1	Mobile phone ownership	94
5.2.3.2	Mobile phone usage.....	95
5.2.3.3	Knowledge on the mobile phones among the survey participants	96
5.2.4	<i>Participants' knowledge, opinions and intention to use m-banking service</i>	96
5.2.4.1	SME owners/managers' previous knowledge on m-banking ...	96
5.2.4.2	Benefits of using m-banking for SMEs	97
5.2.4.3	Concern and barriers in using m-banking to the rural SMEs....	97
5.2.4.4	Intention to use m-banking service.....	98
5.2.5	<i>Hypothesis testing</i>	98
5.2.6	<i>Evaluation of the model</i>	101
5.2.6.1	Overall model evaluation:.....	101
5.2.6.2	Goodness of Fit.....	101
5.3	Focus group (m-banking provider) data analysis and results	102
5.3.1	<i>Advantages of using m-banking by the rural SMEs</i>	102

5.3.1.1	Improved banking system for rural SMEs	102
5.3.1.2	The opportunity to offer private bank's service to rural SMEs.....	103
5.3.1.3	The opportunity to create employment by the bank	103
5.3.1.4	Improved rural-urban SME business	104
5.3.1.5	Better control of finance of SME.....	104
5.3.2	<i>Macro and organisational favourable factors</i>	104
5.3.2.1	Ready mobile telecommunication infrastructure	105
5.3.2.2	The central bank's initiatives	105
5.3.2.3	Creating focus on m-banking.....	105
5.3.2.4	Engagement with the SMEs.....	106
5.3.2.5	IT competency of the bank	106
5.3.2.6	SMEs competency	106
5.3.3	<i>Obstacles in m-banking implementation</i>	107
5.3.3.1	MTOs reluctance to make partnership with small banks.....	107
5.3.3.2	Operational obstacle	107
5.3.3.3	M-banking agent management.....	108
5.3.3.4	SME's limited knowledge of technology	108
5.3.3.5	SMEs' shared phone usage	108
5.3.3.6	Conceptual understanding of banking using a mobile phone	108
5.3.3.7	Competition with illegal money transfer	109
5.3.4	<i>Recommendations</i>	109
5.4	Interviews (Bankers, MTO officers and expert representatives) results	110
5.4.1	<i>Rural SME in Bangladesh</i>	110
5.4.1.1	Rural SME banking	111
5.4.1.2	Rural SME's mobile phone adoption.....	113
5.4.2	<i>M-banking advantages</i>	114
5.4.2.1	M-Banking advantages for the rural SMEs	114
5.4.2.2	M-banking advantages for the banks	115
5.4.2.3	M-banking advantages for mobile telecommunication operators (MTOs)	118
5.4.3	<i>Macro-level m-banking factors for rural SMEs in Bangladesh ..</i>	118
5.4.3.1	Country-level factors	118
5.4.3.2	Organizational critical success factors.....	120
5.4.4	<i>Barriers in m-banking adoption</i>	122
5.4.4.1	Rural SMEs' lack of banking awareness of banking benefits	122

5.4.4.2	Lack of banks' and MTOs' effective leadership and limited vision on m-banking	122
5.4.4.3	M-banking providers' competencies	123
5.4.4.4	Problems managing m-banking stakeholders	123
5.4.4.5	Psychological barrier	123
5.4.4.6	Security	124
5.4.5	<i>Recommendations</i>	124
5.4.5.1	Government's intervention.....	124
5.4.5.2	Awareness development among SMEs.....	125
5.4.5.3	Banks and MTOs capabilities checking.....	125
5.4.5.4	Improve legislation to protect customers.....	125
5.4.5.5	Real time inter-bank transaction.....	126
5.4.5.6	Research and knowledge sharing.....	126
5.4.5.7	System quality	126
5.4.5.8	Security	127
5.5	Conclusion:	127

Chapter 6 129

Discussions 129

6.1	Introduction.....	129
6.2	Discussions on rural SMEs in Bangladesh	129
6.2.1	<i>Findings: Rural SME business characteristics.....</i>	<i>129</i>
6.2.2	<i>Demographic profile of rural SME owners/managers</i>	<i>130</i>
6.2.3	<i>Findings: Rural SMEs banking</i>	<i>132</i>
6.2.4	<i>Findings: rural SMEs owners'/ manager' mobile phone usage..</i>	<i>133</i>
6.2.5	<i>Findings: SME owners'/managers' previous knowledge on m-banking and intention to use the service.....</i>	<i>134</i>
6.2.6	<i>Conclusion</i>	<i>135</i>
6.3	Discussions on R.Q 1: Benefits of m-banking.....	136
6.3.1	<i>M-banking benefits for rural SMEs</i>	<i>136</i>
6.3.2	<i>M-banking benefits for banks, MTO and country.....</i>	<i>138</i>
6.4	Discussions on R.Q 2: Customer perspective factors in m-banking adoption by rural SMEs.....	140
6.5	Discussions on R. Q 3: Organisational and country-level factors in m-banking adoption	141
6.5.1	<i>Organisational factors.....</i>	<i>142</i>
6.5.2	<i>Country level factors in m-banking adoption</i>	<i>143</i>

6.6	Discussions on R.Q 4: Barriers to implementing m-banking for the rural SMEs in Bangladesh.....	146
6.7	Discussions on R. Q 5: Recommendations in m-banking adoption by rural SMEs	149
Chapter 7		153
Conclusion and future research direction		153
7.1	Introduction.....	153
7.2	Answers to the Research Questions.....	153
7.2.1	<i>R. Q. 1: What benefits can be achieved for the rural SMEs, banks, telecommunication organisations and the government by offering m-banking to the rural SMEs in Bangladesh?.....</i>	<i>153</i>
7.2.2	<i>Answer to R. Q 2: What are the customer perspective factors which influence the intention of rural SMEs to adopt m-banking in Bangladesh?</i>	<i>155</i>
7.2.3	<i>Answer to R. Q. 3: What are the country-level and organisational factors that impact on implementing m-banking for rural SMEs in Bangladesh?</i>	<i>155</i>
7.2.4	<i>Answer to R. Q 4: What are the barriers in implementing m-banking for the rural SMEs in Bangladesh?.....</i>	<i>156</i>
7.2.5	<i>Answer to R. Q 5: What are the stakeholders' recommendations in m-banking adoption for rural SMEs in Bangladesh?.....</i>	<i>157</i>
7.3	The m-banking framework	157
7.4	Practical and theoretical values.....	160
7.5	Limitations of this research	161
7.6	Future Research Directions.....	162
7.7	Conclusion	162
References		164
Appendix A: Bangladesh at a glance		180
Appendix B: M-banking Literature Gap		181
Appendix C: M-banking Drivers and Factors		182
Appendix D: Databases used for M-banking Literature Review		184
Appendix E: Extract from survey questionnaire		185
Appendix F: Interview instruments (Bank officers)		187
Appendix G: Interview instruments (MTO officers)		192
Appendix H: Interview instruments (Expert representatives)		197

Table of Figures

Figure 2.1: Map of Bangladesh	17
Figure 2.2: Total Telephone, Fixed line and Mobile	27
Figure 2.3: Mobile Industry analysis in Bangladesh	28
Figure 2.4: Technology Diffusion in Bangladesh.....	30
Figure 3.1: M-banking research direction	37
Figure 3.2: M-banking framework based on hypotheses.	48
Figure 3.3: M-banking barriers and concerns.....	57
Figure 4.1: Research Design Framework (Creswell 2003)	61
Figure 4.2: Research Methodology.....	65
Figure 4.3: Data Collection Strategies.....	69
Figure 5.1: Banking frequencies.....	91
Figure 5.2: Participants' intention to adopt m-banking.....	98
Figure 6.1: Micro-level customer factors based on the survey.....	141
Figure 7.1: A framework for providing m-banking to rural SMEs in Bangladesh	157

Table of Tables

Table 2.1: GDP Composition by sections.....	18
Table 2.2: SME definition by Bangladesh Banks (2011).....	20
Table 2.3: Structure of banking industry in Bangladesh	23
Table 2.4: Landline phone subscribers	25
Table 2.5: Internet, and broadband users and subscribers	26
Table 2.6: Mobile phone subscribers in Bangladesh	29
Table 2.7: E-banking facilities in Bangladesh	31
Table 3.1: Definitions of m-banking	34
Table 3.2: Drivers in m-banking research	43
Table 4.1: Variables and items Included in the survey.....	72
Table 4.2: Details of interviewees	76
Table 4.3: Focus group participants' expertise.....	81
Table 5.1: Demographic data.....	86
Table 5.2: Banking status of the SMEs	90
Table 5.3: Reasons for SMEs not having a bank account	90
Table 5.4: Comments on banking satisfaction.....	91
Table 5.5: Reasons for being dissatisfied	92
Table 5.6: rural SME finance statistics.....	92
Table 5.7: Banking service used by SMEs	93
Table 5.8: Alternative way of banking	94
Table 5.9: Mobile phone ownership	94
Table 5.10: Use of mobile phone among SMEs	95
Table 5.11: Knowledge on a mobile phone among rural SMEs.....	96
Table 5.12: Previous knowledge on m-banking	96
Table 5.13: M-banking benefits and advantages for SMEs.....	97
Table 5.14: Barriers in m-banking adoption.....	98
Table 5.15: M-banking variables testing using MLR	99
Table 5.16: Hypothesis testing by comparison using MLR	100
Table 5.17: Goodness of fit and Pseudo R-Square	101
Table 6.1: M-banking advantages for rural SMEs.....	137
Table 6.2: M-banking advantages for banks, MTOs and country	139
Table 6.3: Organisational factors in m-banking adoption	142
Table 6.4: Country-level factors in m-banking adoption	144
Table 6.5: Concerns and barriers in m-banking adoption	147
Table 6.6: Stakeholders' recommendations in m-banking adoption	150

Certificate of Original Authorship

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

A handwritten signature in black ink, appearing to read "Md. Farid", with a horizontal line underneath.

Signature of Student:

Date: 8/7/2014

Acknowledgements

This thesis would not have been accomplished without the marvellous help, I received from my supervisors, the participants in this research, the University of Technology Sydney (UTS) research support team and my family. I take the opportunity to thank those people who contributed to this research and to whom I am greatly indebted.

First of all, I had the great fortune to study under the supervision of Dr Laurel Dyson and Associate Professor Valerie Gay. I am very grateful for their supervision and guidance. Their sage advice, insightful criticisms and patient encouragement aided the writing of this thesis in innumerable ways. I am especially grateful to my principal supervisor Dr Laurel Dyson, a great person and a scholar in mobile technology, for the skilful ways in which she lovingly challenged and supported me throughout the whole of this thesis—knowing when to push and when to let up. I would also like to thank my alternative supervisor, Valerie Gay, a great scholar in mobile technology, for her support and contributions in this research.

The completion of the thesis would have been a myth if not for Bee Bee Chua, who actually encouraged me to do this research and directed me to the right path. Thank you Bee Bee for trusting me on my abilities. I would also like to extend my heartfelt gratitude to Dr Terry D. Royce, Senior Lecturer & Research Coordinator, who spent a lot of time to help improve my writing and English.

I would also like to acknowledge and thank all the research participants and particularly the Small and Medium Enterprise (SME) owners and managers, who gave their time to the survey and shared their views despite of their shortage of time. The focus group and interview participants from the banks and mobile operators who participated actively in the research also deserve more than a simple ‘thank you’ and I hope the findings from this research will be a useful reference to them and their companies.

Without the financial support from UTS, this research could not have become reality. I therefore thank UTS and a range of people from Faculty of Engineering and IT and the

Research Administration. Especially, I would like to thank Craig Shuard, the **Research Administration Officer**, who was there always with extended support regarding any administrative needs.

Last but definitely not least, I would like to thank my wife Saiky, my son Ayat, my parents, and my brother Vaia for their emotional support and encouragement during this research. Thanks for their endless love and support throughout my life.

Abstract

The purpose of this thesis is to develop an m-banking (mobile banking) framework for rural SMEs (small and medium enterprises) in Bangladesh. This research is significant as there is relatively little known about the use of m-banking by SMEs in Bangladesh, despite their importance as the second largest source of income in the country. The research, as well as adopting a business focus rather than a consumer focus, as most studies to date have done, also pinpoints several factors that have been largely overlooked in the literature. In seeking to identify a comprehensive range of both micro- and macro-level determinants of m-banking, the resulting framework includes customer perspectives, organisational perspectives and country-level factors that impact on the adoption of m-banking by rural SMEs. In developing the framework, the research employed a mixed methods approach, consisting of a survey of SME owners and managers, followed by interviews and a focus group study with banks and MTOs (Mobile telecommunication organisations).

The research found that poor banking facility, cost, credibility, gender, education and SME business type are the main customer perspective factors that significantly influence the intention of SME owners and managers to adopt m-banking. The findings suggest that the most important advantages of m-banking for rural SMEs comprise improved banking facility, easy settlement of trade, and an improved SME business environment due to faster transactions and better cash management. On the other hand, for banks and MTOs, m-banking can generate profits, improve customer service and management, decrease operating costs, increase brand image and create employment in rural areas. The findings with respect to organizational factors suggest that having an m-banking project within the bank's/MTO's objectives, their level of engagement with SMEs, the technology and human resource capabilities of the banks, the development of mobile infrastructure, and top-level management's support are important in m-banking development. However, barriers to providing m-banking to the rural SMEs include lack of banks' effective leadership, limited vision regarding m-banking by the stakeholders, MTOs' reluctance to make partnerships with new banks, and m-banking providers' competencies and security. Country-wide factors identified included concern over lack of proper policy and regulation in Bangladesh.

The framework will be of value to the government, banks and MTOs in accelerating the development of m-banking in Bangladesh. The research recommends that, in order to support rural SMEs, government intervention in m-banking projects and policy and regulations development is needed. This research is expected to support national policies, such as the Millennium Development Goal 2015 and the National IT Policy of Bangladesh. Furthermore, it has implications for other developing countries in improving their banking provision to SMEs and realizing their own development goals through mobile technologies.

Publication for this research

Ahad, M. T., Dyson, L. E & Gay, V. (2013). Investigating macro-level M-Banking For Rural SMEs From The Bank Perspective, Proceedings of The First AIS-Journals Joint Author Workshop in PACIS, Jeju Island, Korea, June 18, 2013. .

Link: <http://www.cob.calpoly.edu/~eli/AIS-JJAW-PACIS2013/1-1.pdf>

Ahad, M. T., Dyson, L. E & Gay, V. (2013). Exploring M-Banking For Rural SMEs From The Bank Perspective, Pacific Asia Conference on Information Systems (PACIS).

Link: <http://aisel.aisnet.org/pacis2013/216/>

Ahad, M. T., Dyson, L. E & Gay, V. (2012). Towards an M-Banking Framework for Rural SMEs in Bangladesh, IBIMA 2013, Spain.

Link: <http://www.ibima.org/spain2012/papers/mdta.html>

Ahad, M. T., Dyson, L. E & Gay, V. (2012). An Empirical Study of Factors Influencing the SME's Intention to Adopt m-Banking in Rural Bangladesh, Journal of Mobile Technologies, Knowledge & Society, vol. 2012.

Link: <http://www.ibimapublishing.com/journals/JMTKS/2012/508433/508433.pdf>